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Case Report

COVID-19 in a complex obstetric patient with cystic fibrosis

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Abstract We report the first case of COVID-19 in a pregnant patient with cystic fibrosis. We describe the diagnosis, clinical course and management of the patient and their family with regards to clinical, social and infection control measures around delivery. This case highlights the importance of the cooperation of multidisciplinary teams to achieve good clinical outcomes in complex patients with COVID-19.

Highlights

- Pregnant patients and those with cystic fibrosis can have favourable outcomes in the setting of COVID-19.
- Complex patients with COVID-19 should be managed by multidisciplinary teams.
- Infection control should be adapted to the situation with consideration of parental wishes.

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Introduction

The pandemic of novel coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) continues worldwide. Viral respiratory infections such as influenza are known to result in more severe illness in individuals with chronic lung disease and in pregnancy [1]. This report describes management of the first known case of COVID-19 in a pregnant patient with cystic fibrosis including infection prevention and control measures around delivery.

Case report

In March 2020 a 42-year-old transgender patient G2P1 (genetically female, identifying as male) at 39 + 3 weeks gestation with underlying cystic fibrosis (F508del/R117H and IVs8 7T/9T polyT variants), was admitted to a Tertiary hospital in Queensland Australia due to possible COVID-19 with symptoms of cough and increased sputum production for 5 days. His female partner was admitted the day prior due to fever and productive cough following international travel with SARS-CoV-2 detectable on testing. A detectable result for our patient returned on day 3 of admission. Testing was done by means of an in-house real-time reverse-transcriptase-polymerase-chain reaction (PCR) assay of a nasopharyngeal swab. Both patients were managed in airborne precautions which included use of negative pressure room and personal protective equipment (PPE) including N95 mask, eye shield, long sleeve disposable gown and gloves.

Examination findings demonstrated a clear chest on auscultation, oxygen saturation 97%, temperature 37.1 °C and other vital signs within normal range. Pre-pregnancy BMI was 23kg/m2 with no history of chronic colonisation and most recent pulmonary function testing demonstrating a forced expiratory volume in 1 s (FEV1) of 3.2L (84%), forced vital capacity (FVC) of 4.55L (96%), FEV1/FVC ratio of 0.70 and DLCO 110%. Regular medications included budesonide/formoterol, salbutamol, nebulised saline as required, pancreatic enzyme and pregnancy multivitamins. The patient's first pregnancy via in vitro fertilization (IVF) 4 years prior had been uncomplicated with spontaneous vaginal delivery (SVD) at term. Current pregnancy also achieved with IVF had been complicated by 2 pulmonary exacerbations necessitating oral antibiotics and corticosteroids.

On day 2 of admission, the multidisciplinary team comprising members from infectious diseases, obstetrics, obstetric medicine, respiratory medicine, anaesthetics, and neonatology began planning for induction of labour (IOL). Daily chest physiotherapy for sputum clearance was conducted and respiratory function closely monitored. Regular inhalers and salbutamol (via spacer) were continued. Blood investigations on day 4 demonstrated only minor abnormalities with reduced albumin at 30 g/L and raised ALP at 111 U/L. Chest X-ray was not performed.

Discussions with the multi-disciplinary team and the two parents informed the infection control plan. The patient would be transferred to a single room on the labour ward without negative pressure (as none existed in the hospital) on airborne precautions with staff in PPE and the partner able to attend in PPE. The parents elected to have the newborn in the same room as our patient following birth and to reduce transmission risk with hand hygiene, cough etiquette and surgical mask for close contact.

Induction of labour commenced on day 6 of admission at 40 + 1 weeks gestation via artificial rupture of membranes (ROM) and oxytocin infusion. Continuous electronic foetal monitoring via cardiotocography (CTG), standard maternal observations and hourly oxygen saturations were carried out throughout labour and were within normal range. Epidural analgesia was declined by our patient and Nitrous Oxide was unable to be utilised without a microbiological filter. SVD of a live baby weighing 3.77 kg occurred 3 h and 26 min after ROM with skin to skin post-delivery and 1- and 5-min Apgar score of 9. Our patient remained stable with reduction in sputum; however, SARS-CoV-2 remained detectable on day 8 of admission. No antibiotics or corticosteroids were required.

Following discussions between the Infectious Diseases unit, Public Health and Hospital in the Home (HITH), discharge for self-isolation occurred day 3 post-partum. Daily review continued with ongoing testing to document clearance of the virus, a requirement at the time of this case. SARS-CoV-2 RNA was not detectable for our patient from day 1 post discharge. At follow up 10 days post discharge, all patients remained well with no community or nosocomial transmission.

Additional testing to assess for vertical transmission included oropharyngeal and nasopharyngeal swabs of neonate day 1 and 7 post-delivery with SARS-CoV-2 not detected by PCR. Placental, meconium and milk specimens did not have SARS-CoV-2 detected, although noting these were unvalidated sample types for the assay used. IgG, IgM and IgA antibodies to SARS-CoV-2 were detected in milk using an in-house microsphere immunoassay, not currently validated for this sample type. Using the same assay IgG but not IgM was reactive in our patient's serum.

Discussion

This is the first known case of a pregnant patient with cystic fibrosis infected with SARS-CoV-2. At the time of this case, local guidelines for management of COVID-19 in pregnancy [2] had not been released and there were no reported cases in patients with cystic fibrosis. A number of case series in pregnant patients have now reported severity of illness similar to that in non-pregnant with low risk of vertical transmission [3]. The largest cohort of cystic fibrosis patients with COVID-19 involving 40 cases also reported similar disease course [4].

IOL was performed in this case due to reported risk of severe disease in second week of illness [5], comorbid cystic fibrosis and advanced maternal age. Our patient delivered a healthy baby with no transmission to neonate despite immediate and ongoing contact post delivery with antibodies detectable in our patient's serum and breast milk. The patients partner also suffering from COVID-19 was supported to attend the birth with the use of PPE. The family was discharged to private residence under the care of HITH prior to clearance swabs which allowed mitigation

of risk to community and health staff with release of 2 negative pressure rooms and reduced PPE use, an important consideration given potential for shortages in a pandemic. This case demonstrates that patients with cystic fibrosis and pregnancy can have favourable outcomes in the setting of COVID-19. These patients should be managed by a multidisciplinary team to ensure optimal care, including infection control to prevent transmission, and consideration of parental wishes with regards to delivery and care of the neonate following birth.

Authorship statement

AW,KW,RS,TB and TB were involved in the care of the patient and in writing of the paper including intellectual content and final editing. CC and SS were involved in the PCR and serological testing of the specimens detailed in the paper and in editing of these sections of the paper. DR was involved in writing and final editing of the paper.

Declaration of Competing Interest

None.

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Ethics and patient consent

Written patient consent has been obtained and the patient has reviewed the manuscript with approval by local ethics council.

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